



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
National Ocean Service
Office of Ocean Resource Conservation and Assessment
Hazardous Materials Response and Assessment Division
c/o EPA Waste Management Division (HEE-6)
J.F. Kennedy Federal Building
Boston, MA 02203
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Ms. Christine Williams
U.S. EPA Waste Management Division
J.F. Kennedy Federal Building
Boston, MA 02203

Mr. Philip Otis
U.S. Department of the Navy
Northern Division - NAVFAC
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Dear Ms Williams/Mr. Otis:

Thank you for the Draft IR Program, Site 07, Calf Pasture Point, Phase III Remedial Investigation, Naval Construction Battalion Center, Davisville, RI, prepared by EA Engineering, Science and Technology, August, 1996. This review will focus on linking groundwater contamination found beneath Site 07 with sediment contamination and biological effects observed off Calf Pasture Point. In general, the Site 07 RI data do not provide a clear picture of the pathways or sources of contamination found in the sediments off Calf Pasture Point. There are several gaps in the data that do not allow a clear link to be drawn and there are also indications that other sources may be contributing to noted biological effects. NOAA has several comments and recommendations.

The Phase III RI for Site 07 presented the results of Phase III groundwater investigations as well as Phase I and II groundwater and soil studies. Over 30 groundwater wells were sampled and 75 soil samples were collected during the three phases of the RI investigation. Most samples were analyzed for VOCs; very few samples were analyzed for the other TCL organic compounds. Many of the groundwater samples (all in Phase III) were also analyzed for TAL metals.

RI investigations found that VOCs are the primary contaminants present in subsurface soils and groundwater. The highest degree of contamination was found in the deep aquifer; concentrations of total VOCs were in excess of 100,000 $\mu\text{g/l}$. VOCs were also observed at elevated concentrations in soil borings. Several trace elements (total) were observed at elevated concentrations in the groundwater during Phase II studies but were generally not elevated during Phase III studies. The RI reported that Phase II groundwater samples were turbid.

There were several different contaminants found in the sediments off Calf Pasture Point (trace elements, pesticides, PAHs, and VOCs) while the primary contaminants found in the groundwater were VOCs. The distribution of VOCs in the groundwater indicate that the primary source is near Allen Harbor. Concentrations of total VOCs exceeded 100,000 $\mu\text{g/l}$ in some wells and a groundwater plume migrating toward Calf Pasture Point sediment stations

was apparent. Two wells located approximately 30 m from the Calf Pasture Point intertidal zone contained total VOC concentrations between 1,000 and 8,000 µg/l.

The trace elements were generally not elevated in groundwater; over 30 wells were sampled for total metals during Phase III. Elevated concentrations of trace elements were observed during Phase II, but only a few wells were sampled and samples were described as turbid. Organic compounds other than VOCs were analyzed for in only a few groundwater samples during Phase I investigations, and were undetected. Phase II and III investigations did not analyze for organic contaminants other than VOCs.

These data indicate that: 1) VOC contamination in the sediments off Calf Pasture Point may be linked to Site 07, 2) other sources may also be contributing to sediment contamination, and 3) organic contamination other than VOCs have not been characterized in the groundwater beneath Calf Pasture Point.

The bioassessment investigations conducted as part of the Marine Ecological Risk Assessment showed biological effects off Calf Pasture Point. Effects that could be categorized as moderate were observed in two of 10 bioassessment stations located off Calf Pasture Point. At Station V3, amphipod survival was 60 percent, which was significantly lower than reference tests. At Station W11, 100 percent of the clams collected had neoplasia. Increased levels of neoplasia were also observed at Stations W12 (15 percent) and W14 (27 percent) compared to reference (1.5 percent), but sediment bioassays did not show statistically significant effects at these stations. Sediment chemistry data showed several organic compounds (PAHs, VOCs, pesticides) and trace elements at elevated concentrations.

The bioassessment data indicate that biological effects off Calf Pasture Point were localized, not very severe, and may have been caused by contaminants not associated with contaminated groundwater. Stations V3 and W11 are located in the intertidal wetlands nearest to the VOC plume beneath Calf Pasture Point. It was not clear which of the contaminants caused the toxicity at Station V3, but at stations where effects were more severe (within Allen Harbor), there appeared to be an association with toxicity and high concentrations of PAHs, DDE, and PCBs. At Station W11, only six clams were collected for histopathological examination. This precluded a station by station statistical comparison with the reference sites and hence, the results should be viewed with some caution. Biological effects were generally not observed in sub-tidal areas.

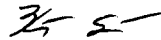
Overall, there appears to be evidence that VOC contamination in the sediments off Calf Pasture Point are site-related, but the source of the trace elements and other organic compounds cannot be as clearly linked. It is possible that the trace elements and organic compounds are the result of historical releases; or that dilution of carrier solvents or Eh or pH changes upon discharge are resulting in the accumulation in the surface sediments from low concentrations in the groundwater. Because of the presence of these latter two substances (trace elements and organic compounds other than VOCs) in the sediments, a clear link between groundwater contamination and biological effects cannot be made as well.

The trace elements and other organic compounds observed in Calf Pasture Point sediment are contaminants of concern within Allen Harbor, but with the exception of the metals, were not characterized in the groundwater beneath Site 07. The data would warrant additional groundwater sampling for TCL organic compounds to determine if Site 07 is the source of the more persistent and toxic organic compounds found in the intertidal sediment. This could be performed during a groundwater remedial design phase. Although it is not known if the persistent organic compounds are site-related, the level of groundwater contamination is such that source control may be considered to minimize discharges of VOCs to the wetland. VOCs are not persistent or highly toxic, but the groundwater data indicate that the plume could

discharge to intertidal wetland areas for long periods. If direct discharges (e.g., intertidal seeps) and limited attenuation occurs in the wetland, and if depositional areas within the wetland remain relatively undisturbed, then localized impacts could continue.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to be 'K. Finkelstein', written in a cursive style.

Kenneth Finkelstein, Ph.D.

cc: Tim Prior (USF&WS)